

Ames IT Base Research for Web-based RLV Design

John Melton

ARC

Mary Livingston

ARC

Trang Duong

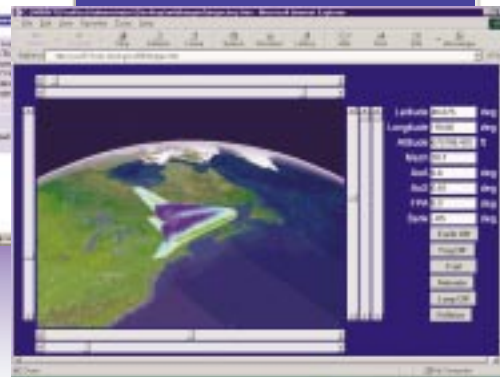
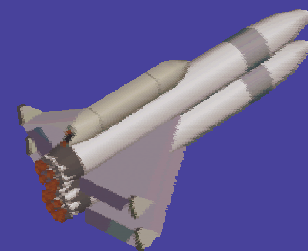
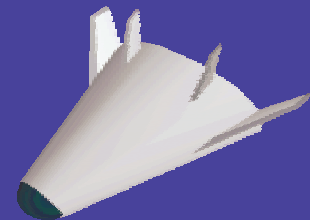
Eloret, Inc.

Veronica Hawke

Eloret, Inc.

Lawrence Liang

Eloret, Inc.

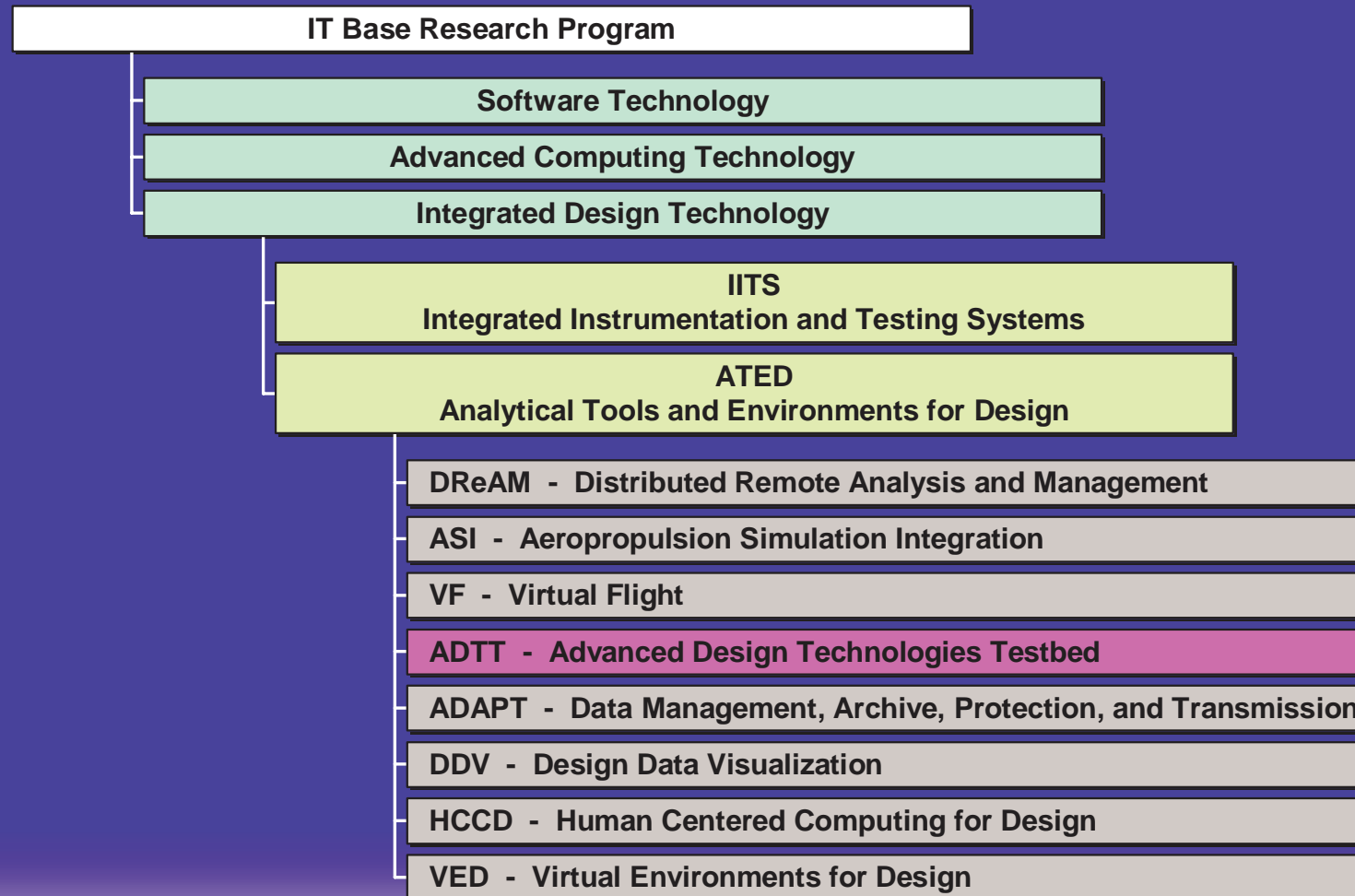


Agenda

- IT Base elements and ATED objectives
- ARC legacy in integrated design systems
- Lessons learned from previous systems
- Demo of ADTT-Web System
 - Objectives
 - Architecture overview
 - Perform design change - modify, analyze, examine
- Technology transfer areas
- Future ATED work



IT Base Program



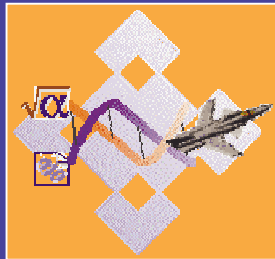
IT Base / IDT-ATED Objectives

- Insert IT into prototype integrated design environments
 - Object, web, and database technologies
 - Intelligent agent architectures
 - Knowledge capture and re-use
 - Collaborative design team environments
 - Variable-fidelity data fusion
 - Novel data presentation
- Transfer technology and experience to agency programs



Integrated Design Systems

DARWIN



Date: 1995+

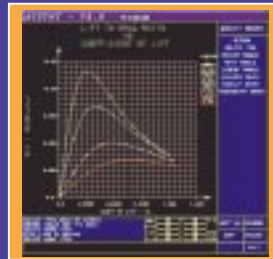
Type: Web

Purpose: WT data

DB: Sybase

Tools: 2D Chart
Flo viz

FEST



1997

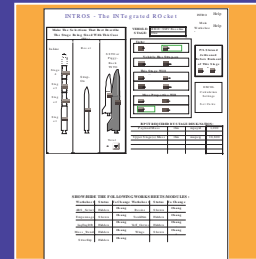
Java App

HWT design

UNIX

CFD
PRO-E
2D/3D viz

MSFC-App



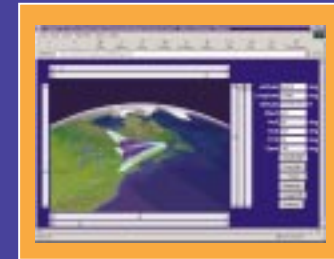
1999

TCL/TK

Bantam

INTROS
PRO-E
HAVOC
NAFCOM

ADTT-Web



2000 +

Web

Space Vehicle

ObjectStore

CFD/CAE

PRO-E

2D/3D viz

Collaboration



Lessons Learned

- Platform dependence can be a good thing
- There is always a newer technology
- It takes at least three tries to get things right
- Design assuming change
 - Don't write GUIs, write software that writes GUIs
- **Caveat Emptor**
 - NASA Contract #NAS2-00062 Report



ADTT-Web Design System

- Objective : collaborative preliminary design for RLVs
- Architecture
 - Web browser client interface using MS IE 5+ on Win 98/NT/2000
 - JSP, DHTML, Active-X plug-ins
 - ObjectStore DB, scripts to run CAD and launch analyses
- Available Tools
 - Collaborative geometry visualization (iEngineer / Vuent)
 - PRO-ENGINEER
 - HAVOC mission analysis
 - 2D/3D visualization
- System descriptive report available in February



Web-enabled Design Change

- Browse data in database
- Collaborate on the geometry (iEngineer/Vuent)
- Modify the geometry with ProENGINEER
- Launch HAVOC for mission analysis
- Compare results in 2D (GigaSoft)
- View trajectory in 3D
 - Browser (Wild Tangent)
 - World Tool Kit



Three Perspectives



ObjectStore DB

Three overlapping web browser windows from the ADTT (Advanced Design Tool) application. The top window shows the 'ANALYSIS' perspective with a tree view of project components like Disciplines, Trajectory, and Aerodynamics. The middle window shows the 'MISSION' perspective with a similar tree view. The bottom window shows the 'CONCEPT' perspective, which includes a 'BI_MES Information' table. The table has columns for Data, History, Notes, and Parameters. The 'Data' column contains descriptive text for each perspective. The 'History' column displays object-level history. The 'Notes' column displays object-level notes. The 'Parameters' column displays object-level parameters, values, and descriptions for editing.

	Data	History	Notes	Parameters
Data	Concepts Window: Data table for selected concept sorted by Discipline/Analysis and Mission/Trajectory Missions Window: Data table for selected mission sorted by Discipline/Analysis and Concept/Vehicle Analyses Window: Data table for selected analysis sorted by Concept/Vehicle and Mission/Trajectory	Displays object-level history/content map	Displays object-level notes for editing	Displays object-level parameters, values, and description for editing



IT Technology Transfer to RSTS

- Web infrastructure
- Database schema
- JSP - database connectivity
- CAD and analysis scripting
- Web visualization / simulation techniques

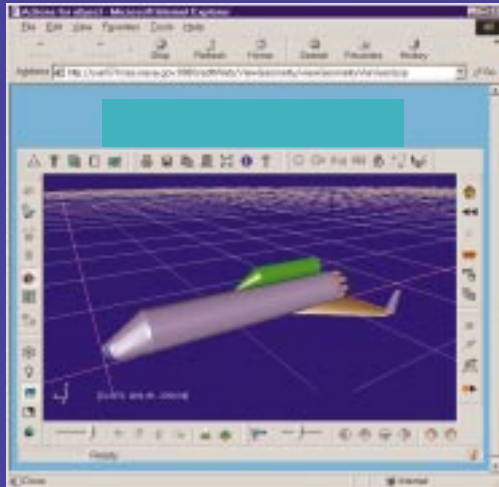


ARC IT Base: Future Work

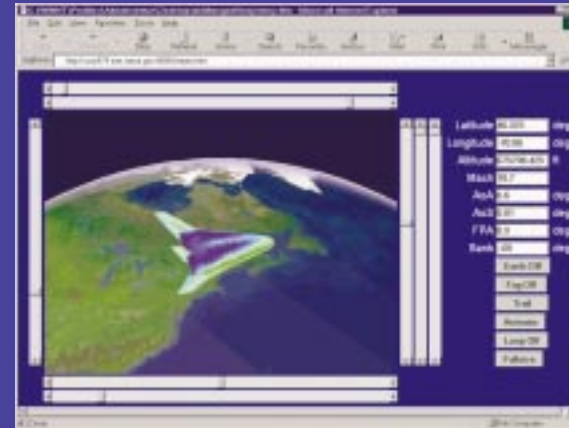
- Fusion of variable fidelity, multi-disciplinary data
- Data presentation and navigation strategies
- Automated design assistance
- Intelligent agents for process reconfigurations
- Design intent and history
- Continue technology transfer



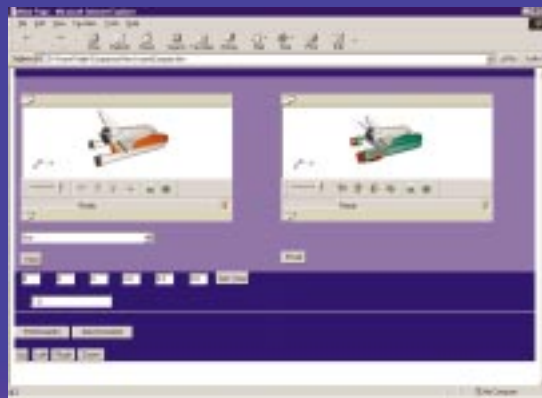
Browser Access to Data



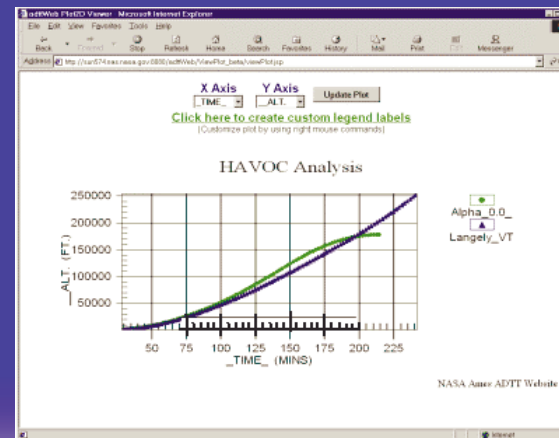
Geometry Markup



Mission Visualization



Design Comparisons



Automated Analyses

